

WHAT IS CLAIMED IS:

1. A power factor corrected boost converter circuit comprising:
a rectifier connectable to an ac input and having a rectified dc output
provided across a dc bus;
an inductor having first and second terminals connected in one leg of the dc
5 bus, a first terminal of the inductor coupled to the output of said rectifier;
an integrated circuit comprising a control circuit for controlling a switch, the
integrated circuit comprising a housing enclosing the control circuit, the integrated
circuit having a power terminal, a ground terminal, a first control input terminal
coupled to an output of the converter circuit, and a second control input terminal
10 coupled to a sensor for sensing current in the dc bus and further having an output
terminal connected to the switch;
a boost rectifier diode having a first terminal, the first terminal of the diode
coupled to the second terminal of the inductor, the diode having a second terminal;
and
15 a storage capacitor connected to the second terminal of the diode;
wherein the control circuit comprises a one cycle control circuit having an
integrator reset by a clock signal for each cycle of the clock signal, the integrator
receiving as an input a signal provided on said first control input terminal;
further comprising an inrush current limiting circuit for limiting the current
20 through the inductor to a value below a predetermined level.
2. The converter circuit of claim 1, wherein the integrated circuit
includes the switch and a gate driver for driving the switch receiving an output from
the control circuit; and the output terminal of the integrated circuit comprises a main
terminal of the switch..

3. The converter of claim 1, wherein the output terminal of the integrated circuit is coupled to a control terminal of the switch.

4. The converter circuit of claim 1, wherein the converter circuit operates in continuous conduction mode.

5. The converter circuit of claim 1, further comprising a sense resistor in one leg of said dc bus, one terminal of the sense resistor being coupled to the second control input terminal, said sense resistor providing a signal indicative of the inrush current.

5 6. The converter circuit of claim 1, wherein the inrush current limiting circuit comprises a resistor in series with the inductor and a controlled bypass circuit for bypassing the resistor when the inrush current is below the predetermined level.

7. A power factor corrected boost converter circuit comprising:
a rectifier connectable to an ac input and having a rectified dc output
10 provided across a dc bus;
an inductor having first and second terminals connected in one leg of the dc bus, a first terminal of the inductor coupled to the output of said rectifier;
an integrated circuit comprising a control circuit for controlling a switch, the integrated circuit comprising a housing enclosing the control circuit, the integrated
15 circuit having a power terminal, a ground terminal, a first control input terminal coupled to an output of the converter circuit, and a second control input terminal coupled to a sensor for sensing current in the dc bus and further having an output terminal connected to the switch;

20 a boost rectifier diode having a first terminal, the first terminal of the diode
coupled to the second terminal of the inductor, the diode having a second terminal;
and

a storage capacitor connected to the second terminal of the diode;

wherein the control circuit comprises a one cycle control circuit having an
integrator reset by a clock signal for each cycle of the clock signal, the integrator
25 receiving as an input a signal provided on said first control input terminal;

further comprising a fan motor speed control circuit, the fan motor speed
control circuit regulating the fan motor speed as a function of the current sensed at
said second control input terminal.

8. The converter circuit of claim 7, wherein the fan motor speed control
30 circuit comprises a control device receiving a pulse width modulated drive signal
from said integrated circuit.

9. The converter circuit of claim 7, wherein the integrated circuit
includes the switch and a gate driver for driving the switch receiving an output from
the control circuit and the output terminal of the integrated circuit comprises a main
35 terminal of the switch.

10. The converter circuit of claim 7, wherein the output terminal of the
integrated circuit is coupled to a control terminal of the switch.

11. The converter circuit of claim 7, wherein the converter circuit
operates in continuous conduction mode.

12. The converter circuit of claim 7, further comprising a sense resistor in one leg of said dc bus, one terminal of the sense resistor being coupled to the second control input terminal.

13. A power factor corrected boost converter circuit comprising:
5 a rectifier connectable to an ac input and having a rectified dc output provided across a dc bus;
an inductor having first and second terminals connected in one leg of the dc bus, a first terminal of the inductor coupled to the output of said rectifier;
an integrated circuit comprising a control circuit for controlling a switch, the
10 integrated circuit comprising a housing enclosing the control circuit, the integrated circuit having a power terminal, a ground terminal, a first control input terminal coupled to an output of the converter circuit, and a second control input terminal coupled to a sensor for sensing current in the dc bus and further having an output terminal connected to the switch;
15 a boost rectifier diode having a first terminal, the first terminal of the diode coupled to the second terminal of the inductor, the diode having a second terminal;
and
a storage capacitor connected to the second terminal of the diode;
wherein the control circuit comprises a one cycle control circuit having an
20 integrator reset by a clock signal for each cycle of the clock signal, the integrator receiving as an input a signal provided on said first control input terminal;
further comprising a housekeeping power supply controller, said housekeeping power supply controller being controlled by a feedback voltage comprising the voltage level on said power terminal.

25 14. The converter circuit of claim 13, wherein the integrated circuit includes the switch and a gate driver for driving the switch receiving an output from the control circuit and the output terminal of the integrated circuit comprises a main terminal of the switch.

 15. The converter circuit of claim 13 wherein the output terminal of the integrated circuit is coupled to a control terminal of the switch.

 16. The converter circuit of claim 13, wherein the converter circuit operates in continuous conduction mode.

 17. The converter circuit of claim 13, further comprising a sense resistor in one leg of said dc bus, one terminal of the sense resistor being coupled to the second control input terminal.

 18. The converter circuit of claim 13, wherein the housekeeping power
5 supply controller comprises a controlled device controlled by a PWM signal from the integrated circuit to generate a housekeeping power supply voltage derived from the output voltage of the converter circuit.

 19. An integrated circuit for a power factor corrected boost converter
10 circuit, the boost converter circuit including a rectifier connectable to an ac input and having a rectified dc output provided across a dc bus; an inductor having first and second terminals connected in one leg of the dc bus, a first terminal of the inductor coupled to the output of said rectifier; a boost rectifier diode having a first terminal coupled to the second terminal of the inductor and having a second terminal; and a

storage capacitor connected to the second terminal of the diode; the integrated circuit
15 comprising:

a control circuit for controlling a switch, the integrated circuit comprising a
housing enclosing the control circuit, the integrated circuit having a power terminal,
a ground terminal, a first control input terminal for coupling to an output of the
converter circuit, and a second control input terminal for coupling to a sensor for
20 sensing current in the dc bus and further having an output terminal connected to the
switch;

wherein the control circuit comprises a one cycle control circuit having an
integrator reset by a clock signal for each cycle of the clock signal, the integrator
receiving as an input a signal provided on said first control input terminal;

25 further comprising an inrush current limiting circuit for limiting the current
through the inductor to a value below a predetermined level.

20. The integrated circuit of claim 19, further wherein the switch is
integrated in the integrated circuit and further comprising a gate driver for driving the
switch receiving an output from the control circuit, the output terminal of the
integrated circuit comprising a main terminal of the switch.

21. The integrated circuit of claim 19, wherein the output terminal of the
integrated circuit is coupled to a control terminal of the switch.

22. The integrated circuit of claim 19, wherein the boost converter circuit
operates in continuous conduction mode.

23. The integrated circuit of claim 19, further wherein the boost converter
circuit includes a sense resistor in one leg of said dc bus, one terminal of the sense

resistor for coupling to the second input terminal, said sense resistor providing a signal indicative of the inrush current.

24. The converter circuit of claim 19, wherein the inrush current limiting circuit comprises a resistor in series with the inductor and a controlled bypass circuit for bypassing the resistor when the inrush current is below the predetermined level.

25. An integrated circuit for a power factor corrected boost converter circuit, the boost converter circuit including a rectifier connectable to an ac input and having a rectified dc output provided across a dc bus; an inductor having first and second terminals connected in one leg of the dc bus, a first terminal of the inductor coupled to the output of said rectifier; a boost rectifier diode having a first terminal coupled to the second terminal of the inductor and having a second terminal; and a storage capacitor connected to the second terminal of the diode; the integrated circuit comprising:

a control circuit for controlling a switch, the integrated circuit comprising a housing enclosing the control circuit, the integrated circuit having a power terminal, a ground terminal, a first control input terminal for coupling to an output of the converter circuit, and a second control input terminal for coupling to a sensor for sensing current in the dc bus and further having an output terminal connected to the switch;

wherein the control circuit comprises a one cycle control circuit having an integrator reset by a clock signal for each cycle of the clock signal, the integrator receiving as an input a signal provided on said first control input terminal;

further comprising a fan motor speed control circuit, the fan motor speed control circuit regulating the fan motor speed as a function of the current sensed at said second control input terminal.

26. The integrated circuit of claim 25, wherein the fan motor speed control circuit comprises a control device receiving a pulse width modulated drive signal from said integrated circuit.

27. The integrated circuit of claim 25, further wherein the switch is integrated in the integrated circuit and further comprising a gate driver for driving the switch receiving an output from the control circuit, the output terminal of the integrated circuit comprising a main terminal of the switch.

28. The integrated circuit of claim 25, wherein the output terminal of the integrated circuit is coupled to a control terminal of the switch.

29. The integrated circuit of claim 25, wherein the boost converter circuit operates in continuous conduction mode.

30. The integrated circuit of claim 25, further wherein the boost converter circuit includes a sense resistor in one leg of said dc bus, one terminal of the sense resistor for coupling to the second control input terminal.

31. An integrated circuit for a power factor corrected boost converter circuit, the boost converter circuit including a rectifier connectable to an ac input and having a rectified dc output provided across a dc bus; an inductor having first and second terminals connected in one leg of the dc bus, a first terminal of the inductor coupled to the output of said rectifier; a boost rectifier diode having a first terminal coupled to the second terminal of the inductor and having a second terminal; and a storage capacitor connected to the second terminal of the diode; the integrated circuit comprising:

a control circuit for controlling a switch, the integrated circuit comprising a housing enclosing the control circuit, the integrated circuit having a power terminal, a ground terminal, a first control input terminal for coupling to an output of the converter circuit, and a second control input terminal for coupling to a sensor for sensing current in the dc bus and further having an output terminal connected to the switch;

wherein the control circuit comprises a one cycle control circuit having an integrator reset by a clock signal for each cycle of the clock signal, the integrator receiving as an input a signal provided on said first control input terminal;

further comprising a housekeeping power supply controller;

said housekeeping power supply controller being controlled by a feedback voltage comprising the voltage level on said power terminal.

32. The integrated circuit of claim 32, wherein the switch is integrated into the integrated circuit and further comprising a gate driver for driving the switch receiving an output from the control circuit, the output terminal of the integrated circuit comprising a main terminal of the switch.

33. The integrated circuit of claim 31, wherein the output terminal of the integrated circuit is coupled to a control terminal of the switch.

34. The integrated circuit of claim 31, wherein the boost converter circuit operates in continuous condition mode.

35. The integrated circuit of claim 31, further wherein the boost converter circuit includes a sense resistor in one leg of said dc bus, one terminal of the sense resistor for coupling to the second control input terminal.

36. The integrated circuit of claim 31, wherein the housekeeping power supply controller comprises a controlled device controlled by a PWM signal from the integrated circuit to generate a housekeeping power supply voltage derived from the output voltage of the converter circuit.